# Learning from the Ancient Maya: Conservation of the Culture and Nature of the Maya Forest

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## Introduction

Conservation of scarce cultural and natural resources is the challenge facing the twenty-first century. Deforestation is a common threat, and nowhere is this graver than in the tropics (TNC 2017). Protecting these forests is a major international concern, yet it has been with an approach that rests on the western conservation model of removing the human element from the equation. Tropical research on ecology and botany of the Maya forest of Mesoamerica (Fig. 1) demonstrates that it is dominated by useful plants (Campbell et al. 2006; Ford 2008). This is the result of the domestication of the landscape that fueled the Maya civilization.

Maya forest plants have played a significant role in the global economy—cacao for sweets, vanilla for flavor, logwood for fabric dye, mahogany for wood, chicle for chewing gum, and annatto for food coloring (see Schwartz 1992). The traditional Maya who have managed the forest and created its gardens represent a technological legacy of skills, strategies, and practices that have a direct link to the Maya past and can explain the rise of the Maya civilization (Ford and Nigh 2009, 2015; Ford et al. 2012).

Collective Maya land use approaches serve to manage the water cycle, enhance soil fertility, and provide essential family nutrition, all this and enhancing biodiversity. This intimate knowledge has been challenged since the conquest 500 years ago, handed down through generations despite efforts to destroy it (Ortiz Yam 2009), accusations that it is primitive, and continues to be active today (Terán and Rasmussen 1995). Global land use strategies, however, have eclipsed the traditional

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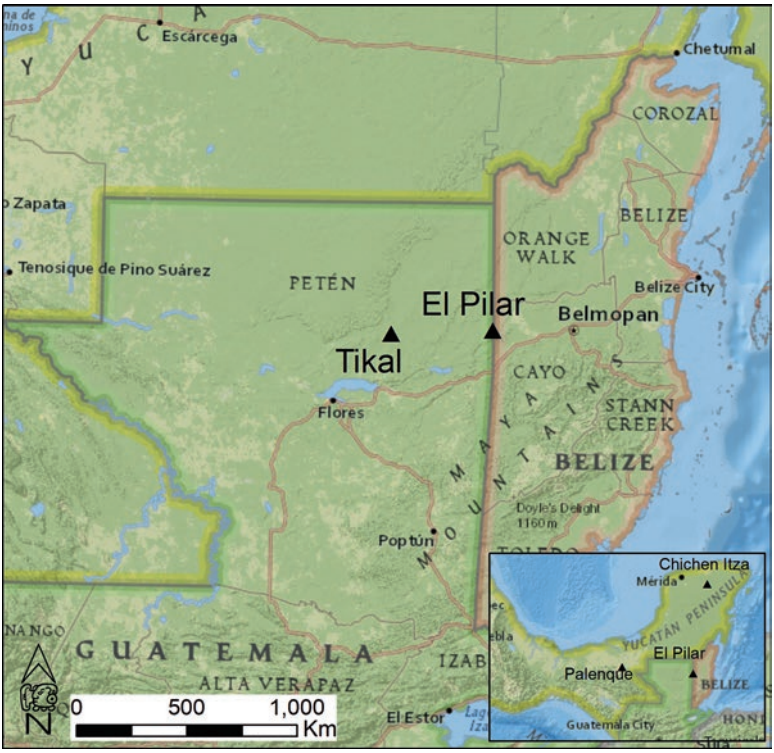


**Fig. 1** Central Maya lowlands with El Pilar located (credit: Anabel Ford, MesoAmerican Research Center)

processes but not their potential (Hernandez Xolocotzi 1995; Gómez-Pompa and Kaus 1990). Persistent traditionalists, the original *permaculturalists* (See Mollison 1988) and heroes of the Maya forest, are ready to share their secrets of prosperity and conservation. This has begun in the village of the Belize River in Belize, Central America. These wise, skillful, and knowledgeable forest gardeners have shared their concepts of cultivating the biological capital as a part of their culture and demonstrated the connection of the forest to their gardens. It is the community of forest gardeners that see the link to the El Pilar Archaeological Reserve for Maya Flora and Fauna and are transforming the visibility of their heritage practice from the local to the national and international stage.

Känan K'aax (well-tended forest in Mayan) is the name of the community school garden, initiated in 2008 to offer an innovative venue of outdoor learning focused on the Maya traditions of forest gardening. Collaboration between the California nonprofit Exploring Solutions Past—The Maya Forest Alliance (ESP~Maya) and the community based organization of the El Pilar Forest Garden Network (EPFGN) has worked to enhance a school garden space. Over the course of the past years this collaborative project has developed a Känan K'aax model school garden and a

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school program of study that highlights health, environment, and science based on Belize education curriculum. This program links the traditions of Maya forest gardening with the current education curriculum, bringing outdoor learning to young students in the area of the ancient center of El Pilar.

## Ancient Roots and Future Conservation

The Maya forest is among the most biodiverse forests of the world, a hotspot of conservation concern (Mittermeier et al. 2000), yet is clearly a co-creation of the human–environment relationship. The dominant plants of the Maya forest are all useful; and we see that this is based on resource management practices that resulted in a domesticated landscape and a veritable forest garden.

As mobile horticulturalists from 8000 to 4000 years ago, the ancestral Maya began to modify the landscape to meet their subsistence needs. They established an integral relationship with the tropical forest that help them adapt to climate change from 4000 to 2000 years ago and resulted in the agricultural system known as the milpa cycle that underwrote the populations growth and development of the Maya civilization (Ford and Nigh 2015). Essential paleoecological indicators show that the Maya lived and farmed in the forest, transforming their forest into a dynamic and domesticated landscape mosaic that cycles from forest to field and back to forest again.

Even with the rise of major civic centers, dispersed populations dwelled in the forest and were integral to sustainable land use system that persisted after the brutal conquest (Terán and Rasmussen 1995). When political crises struck Classic Maya society, the population largely retired to their forest garden, neglecting the large public structures and essentially leaving elite civic centers to the elements. Depopulation after the Spanish conquest resulted in the contemporary feral forest, where floral composition and abundances are still demonstrably influenced by past selection for species of interest to the Maya (Campbell et al. 2006). This reflects the imprint of the Maya who lived by constructing the forest garden wherever they could.

This prehistoric foundation established the sophisticated Maya agroforestry system that is documented today (Gómez-Pompa and Kaus 1990; Hernandez Xolocotzi 1995; Teran and Rasmussen 2008). It is characterized by graded and sequential stages of fields and managed forest growth. Maya smallholders, past and present, employ techniques of the milpa-forest garden cycle that maintains the forest as a garden (Ford and Nigh 2015:Chapter 2).

Today the milpa-forest garden cycle is understood as a polycultivated, tree dominated, biodiverse landscape which works in accordance with natural cycles and maximizes the utility of flora and fauna. The Maya milpa cycle sequences from a closed canopy forest to an open cropped field, continually cycling plots coordinated with the natural processes. When cleared, a field plot is dominated by annual plants and managed in that state for approximately 4 years. This plot is then transformed over the next 8 years into a productive orchard garden, which matures to a closed canopy forest in a continuous minimum 20-year circuit. Contrary to European agricultural

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systems developed around the same period, these fields are never abandoned, especially when they are forested. Thus, it is more accurate to think of the milpa cycle as a rotation of annuals with succeeding stages of perennials during which all phases receive careful and resourceful management.

In fact, every facet of Maya culture is deeply intertwined with their terrain, betraying a relationship that extends far beyond mere subsistence. Even the Maya language demonstrates a long-embedded knowledge of forest ecology (Atran 1999). It is the mainstream scholarship on the Maya that does not take into account the multidisciplinary lines of evidence that informs this relationship. This is changing as the Association of Tropical Biology and Conservation demonstrated with their 2017 Mérida Declaration demonstrates https://tropicalbiology.org/blog/2017/07/15/merida-declaration/.

## Promoting Culture and Nature: The Maya Forest as a Garden

What are we doing to honor this magnificent Maya culture? For the most part the milpa has been relegated as primitive and the process degradingly called slash-and-burn suggesting that cultivated fields are abandoned in favor of shifting cultivation. This fails to acknowledge the great energy, skill, and investment in the perennial component of the cycle.

Appreciating the value of the collective Maya heritage, tenacious traditional farmers want to educate their youth in their own culture. In recognition of the challenges these farmers face in keeping their traditions alive, it was their desire to increase local participation and they were compelled to do more. They wanted their children to understand the forest garden at their home and at the connection to the El Pilar Archaeological Reserve for Maya Flora and Fauna. Consequently, ESP~Maya partnered with their proposed enterprise to use the school as a vehicle for teaching about the traditions (Fig. 2).

Enter the formally unrecognized experts, the El Pilar Forest Garden Network (EPFGN), a group of contemporary practitioners of Maya traditions—stewards of culture and of the land and heroes of the Maya forest. The EPFGN, established in Belize in September 2008, is a collective of farmers who together manage nearly 300 hectares (720 acres) of land of their own forest gardens dividing their land use by varied tasks and keeping more than half their farms in forest reserves (Table 1). Unlike today where the system is eschewed as primitive and destructive, this system was integral in prehistory and supported by the ruling administrations of the past. These strategies have worked for the Maya commons and the forest conservation strategies have been fostered purely through the maintenance of oral traditions; the accumulation of heritage of resource management, passed down over the millennia, centuries, and generations. The forest gardeners have shown us that their millennial practices evident today can be linked directly to the ancient Maya landscape and can be demonstrated as the remarkable analog of ancient Maya settlement patterns

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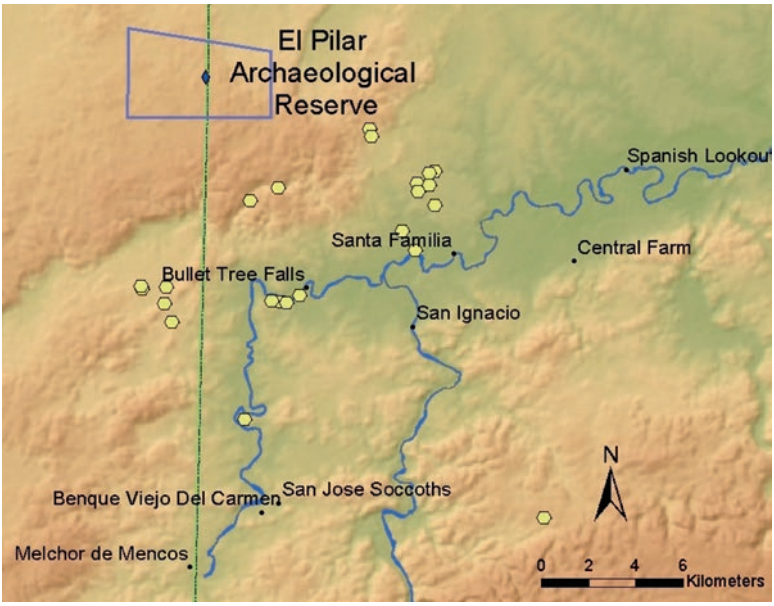


**Fig. 2** El Pilar Archaeological Reserve for Maya flora and fauna and surrounding Forest Gardens (credit: Anabel Ford, MesoAmerican Research Center)

**Table 1** On the Maya Forest gardeners

| | |
|---|---|
| Average years experience: 28 | Milpa: 8% |
| Species managed: 62 | Home garden: 3% |
| Native species: 42 | Pasture: 3% |
| Average number of dominant species: 12 | Reforestation: 28% |
| | Reserve: 57% |

(Ford and Nigh 2015). If the underpinnings of the Maya civilization are based on the milpa forest garden cycle, this is a promise for the region's future.

These famers see how the global trends have intervened in their life and want to demonstrate the importance of their knowledge and practice. These master forest gardeners use their traditional skills and their practical investment in the Maya forest garden every day. They share a technological legacy of skills, strategies, and practices with a direct link into the Maya past and El Pilar. This sets them apart from the conventional and industrial monoculture farming in the area. They see the earth become dry without trees, they see the toxins use kill the important earth worms, they recognize the lack of diversity so important to the livelihood of the family. They needed to connect with the children and the unused land of the primary school was the target of their attention.

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## *The Santa Familia School Model School Garden*

The master Maya forest gardeners understand their heritage is vanishing as the traditional practitioners grow old and conventional mechanical and technological agriculture expands. Over the past decade of work, five elder Maya farmers and two collaborators, key to the conservation of the Maya forest garden project, are no longer with us to help promote these important local traditions. Since the accumulation of knowledge has been passed through practice, the school garden project extends the potential of spreading the knowledge by engaging the teachers and their classes to leave no child indoors (Coyle 2010; Neill 1997; Rea and Waite 2009).

Clearly, support of the model primary school garden project, Känan K'aax, comes at a critical time when the struggle for traditions is easily overwhelmed. The forest garden project, endorsed by the Belize Ministry of Education, links contemporary global teaching goals with local traditional environmental awareness. It is a means to honor local traditions and to propagate local forest garden strategies and practices for the youth of the area. The promise is that this model will propagate at other schools to expand the appreciation and conservation of the Maya forest.

Today, the Känan K'aax has basic infrastructure to protect the site and to engage teachers in the garden (Ford and Ellis 2013). The EPFGN maintains the site for the school and the principal and schoolteachers are involved in the developing their outdoor curriculum activities at the garden. On-site activities in at the Känan K'aax model garden are designed to promote involvement in health, nutrition, and environment. Other learning components touch on math, writing, and science. In sum, the efforts involve the traditional forest gardeners in the of the school site for their teachers and children; institutionalize the model garden at the school with periodic workshops and feature the link of local traditions of forest gardening to the major Maya center of El Pilar.

## *The Känan K'aax Garden Site*

Part of the ten-acre school property, the Känan K'aax model school garden is in the northeast corner of the property connected with a trail from the playing field (Fig. 3). The garden is a fenced one-acre plot where the El Pilar Forest Garden Network constructed a roofed gallery and latrines as an outdoor classroom. This area has trails to various areas that feature trees of the global garden where approximately 6 out of every 10 are native trees, including representatives of those nurtured by the ancient Maya that are dominant in the Maya forest today. The garden has two entrances, one from the school and the other on the street. The trails are marked with white stones and the identification of plants and their locations are posted (Fig. 2). While the master forest gardeners know the plants and their locations, these need to be understandable to those who teaching and learning (Fig. 4).

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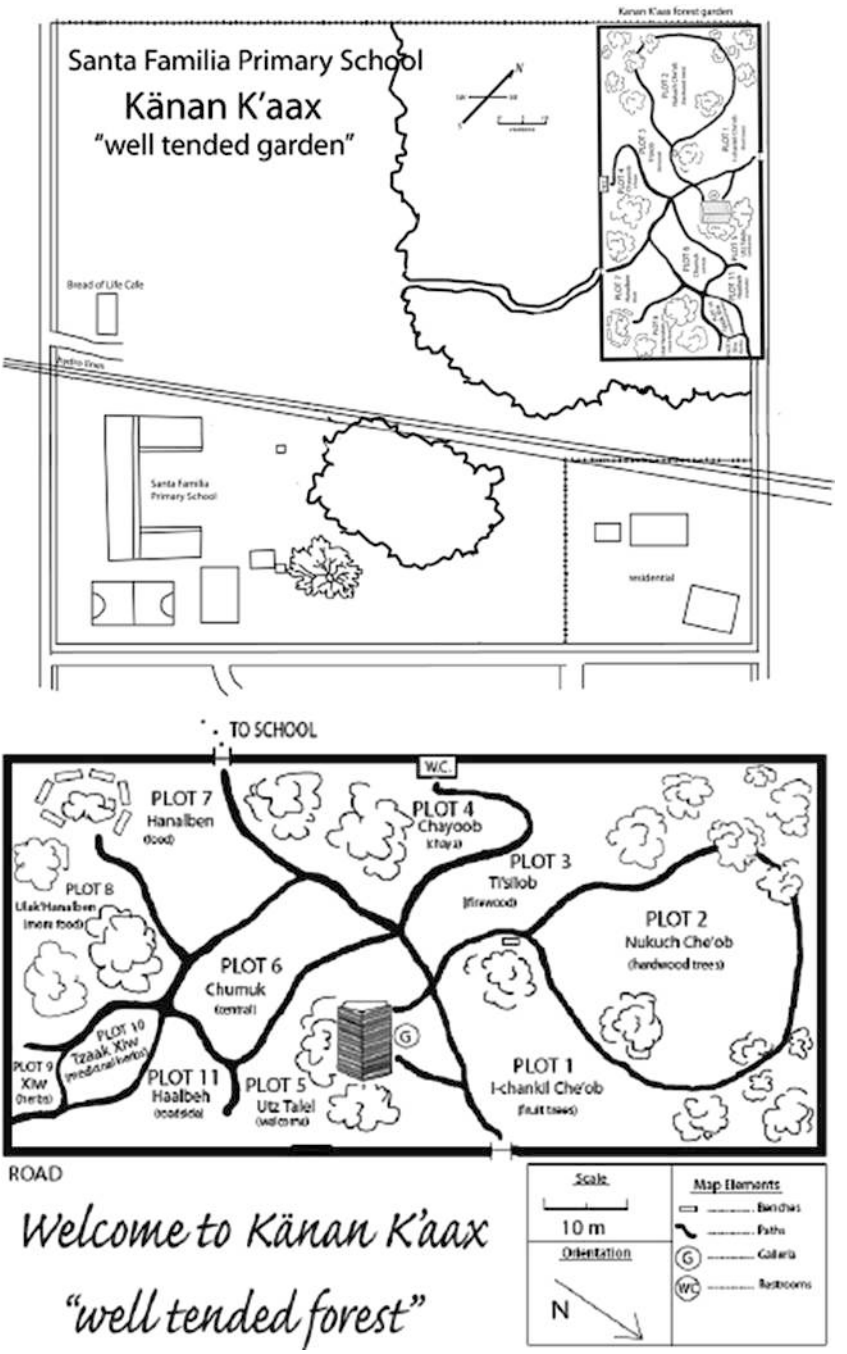


**Fig. 3** The Santa Familia primary School plan with the location of the school garden in the upper right. The lower figure is a detail of the Känan K'aax School Garden with trails and plots (credit: Anabel Ford, MesoAmerican Research Center)

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**Fig. 4** The Känan K'aax Model School Garden in Action as Master Forest Gardener Narciso Torres Explains the Uses of the *Cordia dodecandra*, known as Ciricote (credit: Anabel Ford, MesoAmerican Research Center)

Working with the master gardeners, we enumerated the plants in the school garden area, developed a list of the locations of the dominant plants, and identified where more plants of the Maya forest were needed. We also included 20 native plants illustrated in the children plant book that printed in English and Spanish as part of the endeavors (Ford 2012).

Based on the field work, a sketch map of the site was developed with trails and plot names in Mayan with translations to build on the Maya roots. Signage needed to be simple and replaceable. We printed, laminated, and mounted labels for the plants and plots that could be renovated easily as needed. Galvanized holders were specially made to fit the labels and listings as well as the posted maps of the site. The site maps were placed at each entrance, the gate from the school and the gate from the road. These readable labels provide local names as well as scientific names and cover the range of plant habits and light requirements.

## *Objective: No Child Left Indoors*

Känan K'aax is a community-teaching site and a magnificent tool for the primary school. The wealth of heritage knowledge springs from the recognition that the Maya civilization was founded on this heritage and household patterns of the past reflect the importance of land use and management. It is also part of a larger effort

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to bring the out of doors as a classroom. Currently under the stewardship of the Santa Familia Primary School administration, Känan K'aax is now a fenced, gated, and welcoming site for the school children of the village, for children of other schools, and for visitors interested in learning and participating in the site.

Open to primary school students is the essence, but also for the youth engaging with the El Pilar Forest Garden Network to apprentice with their elders to learn the intricate skills and build a focus for visitors from around the world. The Känan K'aax serves as a unique educational site in Belize with a hands-on and accessible forest garden aimed to teach fundamentals of traditional practices for children and other interested groups. The establishment of the model Kanan K'aax provides a basis to teach and understand the importance and inherent value of the conservation traditions of the Maya. The partnerships to develop and integrate school curriculum in the garden promotes "no child left indoors!"

## *Education Promise*

The Santa Familia Primary School garden initiative is designed to ensure that the traditional Maya practices are not lost. On the school property, the Känan K'aax garden site is dedicated to student education and village participation to bring alive the excitement and inspiration of gardening and the out-of-doors.

It is well known that children excel in the outdoor setting, and now the village of Santa Familia has a garden available for outdoor learning directly with field activities designed from a workbook and indirectly for outdoor sessions for reading or writing projects. The classroom is appropriate for the basics, but the wider application of learning is vital. The Känan K'aax school garden offers a versatile and secure site for education and links to the Maya heritage.

The Känan K'aax model garden has designated areas featuring annual and perennial plants. Weaving around the planted areas are trails, clearly marked with white stone, guiding students around the school garden. Along the trails, students can learn about the foods, herbs, as well as fruits and flowers. They will be able to observe the plants that revel in the sun and those that need to be sequestered in the shade. Observation is one of the most important aspects of activities in the Kanan K'aax garden and guarantees to bring gardens from the school into the home.

Importantly, there is a close rapport with the Belize Department of Education and the school Principal. Together we created appropriate didactic literature for educational programs designed for schoolteachers with the map of the site featuring the trails and plant communities based on the knowledge of the forest gardeners. A forest garden plant coloring book in English and Spanish was created to supplement the school teaching efforts and for sale to support the ongoing forest garden aim of the Känan K'aax.

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## Conservation Outcomes

The educational Känan K'aax model school garden highlights the need to share the collective knowledge of the Maya farming heritage and conservation legacy. The school garden project invests environmental education that links elder traditional knowledge to youth and time-honored practices to the ancient Maya of El Pilar. Through the involvement of the school children, traditional forest garden strategies have the opportunity to live on promoting the community landscape of biodiverse habitats of flora and fauna, the useful resources that have been part of daily lives. And learning of the trees links their community landscape to that at the El Pilar Archaeological Reserve for Maya Flora and Fauna.

Regional and international involvement through the nonprofit Exploring Solutions Past—The Maya Forest Alliance builds recognition of the valuable skills and strategies of the Maya forest gardeners through international media venues. The outcome provides an opportunity for the youth to learn profitable and sustainable domestic living practices built on the foundation of the Maya forest gardeners and to connect traditions to the ancient Maya at El Pilar.

Knowing children are open to learning, thirsty for new experience, and excited to engage with the forest garden provides a platform for understanding the culture and nature of the Maya. As the community projects develop, the heritage knowledge becomes incorporated into the new trajectories. The youth who are learning about their landscape are the hope for the future of the conservation of the local cultural and natural resources. They have the potential to can keep the Maya forest alive as they recognize their connections the traditions. These are the fundamentals of the educational environmental curriculum. Without the traditional knowledge and understanding of the flora and fauna of the Maya forest, the next generation will lose the context of their landscape, the Maya forest, and will disconnect from the heritage that is at their backdoor, the major Maya site of El Pilar. The Känan K'aax model school garden provides a setting for children to learn from their elders and to forge their connection to their Maya ancestors. This is a space and opportunity to explore the Maya forest that flourishes with the community.

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